

MONTHLY WEATHER REVIEW,

NOVEMBER, 1878.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In compiling the present REVIEW the following data, received up to December 14th, have been made use of, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at 119 Signal Service stations and 11 Canadian stations, as telegraphed to this office; monthly journals and means, 117 and 141 respectively, from the former, and monthly means from 13 of the latter; reports from 22 special Sunset stations; 228 monthly registers from Voluntary Observers; 40 monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; monthly reports from Voluntary Observers and local Weather Services of the States of Iowa and Missouri; reliable newspaper extracts; special reports.

BAROMETRIC PRESSURE.

Upon chart No. II is shown by the isobaric lines the general distribution of the atmospheric pressure, reduced to sea-level, for the month. Compared with the means for October of previous years, the pressure for the present month is slightly above normal west of the Rocky Mountains, and slightly below east of that region, the greatest deficiency is over the New England States.

The Local Barometric Ranges for the month, as reduced to sea-level, have been largest over New England and the Middle States, from which region they have gradually decreased south and westward to the Gulf and Pacific coasts. Taken by districts, they vary as follows:—New England, 1.60 inches at Boston and Springfield to 1.40 at Burlington and 1.18 on the summit of Mt. Washington; Middle States, 1.60 at Sandy Hook to 1.36 at Lynchburg; South Atlantic States, 1.08 at Cape Lookout to 0.69 at Jacksonville and 0.67 at Tybee Island; Gulf States, 0.75 at Montgomery to 0.61 at Indianola, and 0.39 at Key West; Ohio valley and Tennessee, 1.20 at Pittsburgh to 0.87 at Cairo; Lake region, 1.41 at Oswego to 0.84 at Duluth; Upper Mississippi valley and Minnesota, 0.97 at Des Moines to 0.83 at St. Paul, and 0.90 at Pembina; Missouri valley, 1.06 at Yankton to 0.80 at Bismarck; eastern slope of Rocky Mountains and interior of Texas, 0.96 at North Platte to 0.63 at Deadwood, Dak., and 0.47 at Fort Davis, Tex.; Rocky Mountain stations, 0.63 at Virginia City, Mont., to 0.45 at Cheyenne; 0.58 on summit of Pike's Peak; Western Plateau, 0.84 at Boise City to 0.70 at Pioche; California, 0.75 at Red Bluff to 0.57 at San Diego.

Areas of High Barometer.—Nine of these have been well marked areas, and a brief description of each is given below. Three of them, Nos. II., III. and V., first appeared over the Northwest; four, Nos. IV., VII., VIII. and IX., over Oregon and Washington Territory, and one, No. VI., over California. Their paths were similar, those appearing in the Northwest moving eastward over the Lake region, Ohio valley and Atlantic States, while those first appearing on the Pacific coast moved southeastward over the Rocky Mountains and Southwest, and thence spread over the Gulf States.

No. I.—is a continuation of high area No. VI of the October REVIEW, and was central over the Southern States during the 1st and 2nd, where it was accompanied by clear, frosty weather; on the morning of the 1st the minimum temperatures of the month were experienced at stations from Illinois and Ohio to the South Atlantic coast, and ranged from 24° at Columbus, Ohio, to 41° at Jacksonville, Florida.

No. II.—advanced southward over Montana and Wyoming on the 1st in rear of low area No. II, then central north of the Lake region. 2nd, a general rise in pressure occurred over the entire country, and during the 3rd the pressure was everywhere above the normal, except on the immediate Pacific coast, in advance of low area No. V. Rising temperature prevailed, except from the Lower Lakes to the Atlantic coast. 4th, pressure above normal east of the Mississippi, with maximum pressure over Lake region; barometer falling in the Northwest, in advance of low area No. IV, which was subsidiary to area No. V on the Pacific coast. 5th, passed southeastward off the South Atlantic coast.

No. III—advanced southward over Manitoba and the Northwest on the 6th, separating low areas Nos. IV and V, the former being transferred to the Atlantic coast, the latter remaining central in Nevada. 7th, moved southward into the Missouri valley; lower temperatures, fog, rain and snow prevailed in Colorado and New Mexico, and low area No. V was apparently pushed back toward the California coast. 8th, moved eastward over the Mississippi valley, followed by heavy snow and rain in Colorado and New Mexico, as low area No. V advanced eastward. 9th, was east of the Mississippi, with falling pressure. 10th, was probably dissipated by the joint influence of low areas Nos. V (over the Upper Mississippi valley) and III (over Nova Scotia.)

No. IV—appeared over Oregon on the 9th, and extended eastward on the 10th to the northwest and west of low area No. V. 11th, moved southeastward over the Rocky Mountains, preceded by northerly winds west of the Mississippi, increasing to high, with light rains, on the coast of Texas; Indianola, 7:12 a. m., N. 32, and Galveston, 10:30 p. m., NW. 27. 12th, central over the Southwest, with falling barometer and frosty weather, and, on the 13th, was probably dissipated in advance of low area No. VI.

No. V—appeared over the Northwest on the 12th in rear of, and filling up the extensive trough left by, low area No. V. 13th, it followed in the track of the low area just mentioned, and by morning of the 14th was central over the Lake region. 15th and 16th, moved east and northeast over the North Atlantic States and Lower Canada, producing the lowest temperatures of the month at some stations, ranging from 24° at New Haven to 33° at Erie and Baltimore. 17th and 18th, was central over or north of the Gulf of St. Lawrence, the area extending southward over the Atlantic, (barometer at Bermuda 30.21, probably highest reading of month occurring on morning of this day.) 19th, disappeared in advance of low area No. VI.

No. VI.—Spread over California, the Western plateau and Rocky Mountain region on the 16th. 17th, highest pressure over the Western plateau or Rocky Mountain region, where it remained until the 20th, while an extensive depression, including within its area low pressures Nos. VI, VIII, IX and X, covered the eastern section of the country. 21st, moved southeastward over the Southwest.

No. VII—appeared over Washington Territory on the 22d to the westward of low area No. XI, and during the 23d extended over Montana. 24th, the highest pressure was transferred to the extreme Northwest; light snow prevailed from Montana to Minnesota and New Mexico, and on the morning of the 24th and 25th, the lowest temperatures of the month occurred over this region, ranging from 12° at Santa Fe to zero at Fort Garland, Col., and —15° at Summit, Rio Grande Co., and on summit of Pike's Peak. 25th and 26th, moved eastward over the Lake region to New England, separating low areas Nos. XI and XII. 27th, disappeared eastward over the Atlantic.

No. VIII—appeared in Washington Territory and Oregon on the 26th, and moved rapidly southeastward to Utah and Colorado. 27th, it extended over the Southwest, where the lowest temperatures of the month occurred, ranging from 20° at Fredericksburg to 37° at Indianola and Galveston; frosts were reported from Indianola to the Rio Grande valley. 28th and 29th it moved eastward over the Southern States, producing the lowest temperatures of the month, on morning of the 29th, along the Gulf coast: New Orleans, 41°; Fort Barrancas, 31°; Milton, Fla., 30°, and Key West, 63°.

No. IX—appeared over Washington Territory and Oregon during latter part of the 28th, at which time the pressure was also rising in the Northwest in rear of area No. VIII. 29th, an extensive area of high pressure stretched from the Pacific coast to the Lake region, while low area No. XIV was developing over New Mexico and northwestern Texas. 30th, low area No. XIV moved northeastward into the Mississippi valley, thus dividing the present area of high pressure, the eastern portion of which passed eastward over the Atlantic States, while the original centre remained over the Western plateau. From the 28th to the 30th the minimum temperatures of the month occurred at most stations from California to Utah, and ranged from 47° at San Francisco and 37° at Los Angeles to 9° at Winnemucca.

Areas of Low Barometer.—Of these, fourteen are described below, and the tracks of twelve of them are shown on chart No. I, from a study of which it will be seen that they agree, in general, with those of the same month of preceding years. While over the eastern section of the country their paths were southeastward, but, after reaching the Mississippi valley, changed toward the northeast. Four of them, Nos. VI, VIII, XII and XIV, either originated or commenced their northward trend south of the 35th parallel.

No. I.—The low pressure area No. XIII of the October REVIEW continued during the 1st of the present month off the coast of Nova Scotia and Cape Breton.

No. II—is a continuation of area No. XIV, noticed in the October REVIEW. On the 1st it was probably central some distance north of the Upper Lake region. High winds prevailed on the Lakes, and a severe storm, with heavy sea, on Lakes Michigan and Huron, which resulted in the loss of several vessels and lives along the eastern shore of former and north portion of latter. Cautionary Signals ordered up on the Lower Lakes morning of October 30th were continued, and were ordered up on the Upper Lakes morning of November 1st. The following maximum winds were recorded: Grand Haven, 1 p. m., SW. 36 miles; Port Huron, 12:30 p. m., SW. 30; Cleveland, 1:25 p. m., SW. 30, and Buffalo, 9:26 a. m., SW. 36. The signals at Marquette and Escanaba were ordered late, and not considered justified, the highest velocity at Marquette occurred at 3 a. m., NE. 34. During the day the barometer gradient was quite steep from the Lake region to the Ohio valley, but the storm was unattended by precipitation within the limits of our stations. On the 2nd it passed down the St. Lawrence valley, followed by north to west winds and light rain or snow.

No. III.—During the 4th the pressure fell over the Canadian Maritime Provinces, with light rain or snow and generally northerly winds; at night heavy snow-falls occurred at St. John and Chatham, N. B.,

and at the Magdalen Islands, and on the 5th the centre of depression appeared to move northward over the Gulf of St. Lawrence. 6th, lowest pressure north of New Brunswick, with westerly gales and light snow at the mouth of the St. Lawrence. 7th, it appeared to move up the St. Lawrence valley and to spread southward over New England, attended by cloudy weather and snow. 8th and 9th, it remained over the Canadian Provinces, accompanied by cloudy weather and light rain, sleet or snow, and on the 10th moved off to the eastward.

No. IV.—While area No. V, described below, was probably central over Oregon a subsidiary centre of depression apparently formed in Montana. 5th, it moved southeastward to the Lower Missouri valley, preceded by diminishing pressure, increasing cloudiness, and, during latter part of day, light rain or snow over the Lake region. 6th, On the morning of this day an extensive barometric trough extended from the Lower Missouri valley to New England, and by night the centre of depression was apparently transferred to the Atlantic coast, where it joined area No. III just described. In anticipation of dangerous winds attending the preceding two areas Cautionary Signals were ordered up on the Upper Lakes morning of the 5th; on the Lower Lakes during latter part of day and morning of the 6th; and on the Atlantic coast from North Carolina to Maine on morning of the 6th. The Atlantic coast signals were changed to Cautionary Off-shore Signals at midnight of the 7th and morning of the 8th, and all signals were justified, except at Port Huron and Eastport. The following maximum velocities were recorded:—on the 6th, Duluth, 6:50 a. m., NE. 40; Marquette and Escanaba, 28; Milwaukee, 26; Sandusky, 8 p. m., NE. 32; on the 7th, Alpena, 25; Sandusky, 10 p. m., NW. 32; Cleveland, 8 p. m., NW. 35; Erie, 10 p. m., NW. 32; Buffalo, 1 and 3 p. m., SW. 36; on the 8th, Rochester, 3:45 a. m., and Oswego, 4:15 a. m., NW. 26, storm severe on lake and two schooners driven ashore; Cape May, 11:30 a. m., NW. 46; Barnegat, 1:45 p. m., NW. 36; Sandy Hook, 11:45 a. m., NW. 48; New York, 11:30 a. m., NW. 37; Boston, 3 p. m., NW. 32. These show the highest velocities to have occurred in rear of the storm-centre and in advance of high area No. IV. Vessels arriving at the North Atlantic ports generally reported westerly gales, high seas and rain-squalls from the 5th to the 11th west of the 62nd meridian and north of 40th parallel.

No. V.—appeared on the Pacific coast on the 4th, and cloudy and rainy weather (snow on the mountains) prevailed from San Francisco northward to British Columbia. 5th and 6th, lowest pressure moved southward over the Western Plateau from interior of Oregon and Idaho to Nevada and Utah, accompanied by rain and snow, occasionally quite heavy, and which extended by night of the 6th to Arizona and New Mexico. During these days the pressure was generally below the normal west of the Mississippi, but commenced rising over the Northwest and Upper Lake region during latter part of the 6th, in advance of high area No. IV. 7th and 8th, the lowest pressure (0.10 to 0.20 in. below normal) remained over the Western Plateau, and the highest pressure moved southward into the Mississippi valley; the pressure rising during the 7th, but falling on the 8th at the Rocky Mountain stations. Heavy rain and snow-storms prevailed in Arizona, New Mexico and Colorado. 9th and 10th, storm-centre moved northeastward from Colorado to the Upper Mississippi valley, accompanied by cloudy and rainy weather. Heavy rains of short duration fell in Texas. At Summit, Rio Grande Co., Col., 11,300 feet above sea-level, seventeen inches of snow fell from the 6th to the 10th, the heaviest fall, eight inches, occurring on the 7th. 11th, was over the Lake region, where high winds, cloudy and rainy weather prevailed, and with partly cloudy weather and light rains thence to the East Gulf and Atlantic States. 12th and 13th, was over the St. Lawrence valley and Canadian maritime provinces, followed by brisk to high northwest winds. Cautionary Signals were ordered up morning of the 10th on the Upper Lakes; morning of the 11th on the Lower Lakes, and on the afternoon of same day along the Atlantic coast from North Carolina to New York, (changed to Cautionary Off-shore morning of 12th;) and morning of the 12th along the New England coast, (changed to Cautionary Off-shore afternoon of 13th.) They were all justified, except on Lake Superior and at Eastport, Me. Maximum velocity, on the 11th, Milwaukee, 3:50 p. m., NW. 27; 12th, Grand Haven, 10:30 p. m., NW. 45; Buffalo, 11:50 p. m., SW. 37; Cape May, 12:45 p. m., S. 32; Cape Lookout, 2 a. m., SW. 36; 13th, Sandusky, 5:30 a. m., NW. 44; Oswego, 10:15 p. m., NW. 28; Cape May, 3 p. m., NW. 35; Sandy Hook, 11 a. m., W. 46; New York, 12:45 p. m., NW. 36; Newport, 2:44 p. m., SW. 33; Thatcher's Island, 3:45 p. m., W. 37.

No. VI.—On the 13th, the pressure being above the normal throughout the Mississippi valley, Northwest and Lake region, increasing cloudiness prevailed from Texas to New Mexico, with easterly winds and light rains in former, and northerly winds and light snow in latter. 14th, the lowest pressure was off the coast of Texas; easterly winds and increasing cloudiness prevailed from the Gulf coast to the Lake region to the west of high area No. V, and rainy weather, with winds backing to north and west, in Texas. 15th, storm-centre moved northward to Missouri; severe thunder-storms and heavy rains occurred from eastern Texas to Mississippi and easterly winds, increasing cloudiness and rain, thence to the South Atlantic States and Ohio valley. Cautionary Signals were ordered up morning of the 14th at Indianola and Galveston, and although somewhat late, were justified by easterly winds of 27 and 26 miles, respectively; morning of the 15th, at Port Eads, New Orleans and Mobile, the first two of which were justified by a registered velocity of 25 miles, SE., at Port Eads. 16th and 17th, lowest pressure over the Ohio valley and Lower Lakes, and cloudy and rainy weather extended thence to the Atlantic States. Cautionary Signals were hoisted in the Lake region night of the 15th and morning of the 16th, but were not justified. During latter part of the 17th the minimum pressure was probably transferred to North Carolina and Virginia. 18th and 19th, centre moved northeastward off the Middle Atlantic, New England and Nova Scotia coasts, rapidly in-

creasing in energy and producing brisk to high northerly and easterly winds and heavy rains from Connecticut to Cape Breton. Cautionary Signals were ordered up; morning of the 16th, from Cape May to Sandy Hook; midnight of the 17th, from New York to Portland, and on the afternoon of the 18th at Eastport, were justified as follows: on the 18th, Cape May, 3:30 p. m., N. 27; Sandy Hook, 8 p. m., N. 30; New York, 5 p. m., NE., 31; Boston, 5:50 p. m., NE., 31; on the 19th, Thatcher's Island, 2:30 a. m., N., 44, and Eastport, 2:45 a. m., NE., 36.

No. VII—was probably central near Vancouver's Island, on the morning of the 14th, where stormy weather prevailed throughout the day, preceded by a southeast wind of 40 miles, (estimated) at Victoria; southeast gales and heavy rains continued over this region until the 18th, in consequence of the high-pressure area No. VI. to the southward. During the day the lowest pressure moved southeastward to interior of Oregon, preceded by high southerly winds at places, and heavy coast rains, extending to northern half of California. On the 15th, the pressure rose rapidly at the Pacific coast stations and over the western plateau, and fell at the Rocky Mountain stations and in the Northwest, and this area probably either joined the depression then existing in the Mississippi valley and described as No. VI, or by moving southward over Colorado helped to form area No. VII. On this day light rains and snow fell in Idaho, Nevada and Utah, but no precipitation was reported at the Rocky Mountain stations. At 11 p. m., the pressure at Santa Fe was 29.66 or 0.16 below normal.

No. VIII—appeared in the Rio Grande valley during the 16th, and may possibly be a continuation of area No. VII; at midnight, rising barometer, north to east winds, cloud and rain prevailed over Texas. 17th, storm-centre moved eastward over the Gulf of Mexico, followed by increasing pressure and rains in Texas. Cautionary Signals ordered up at Indianola and Galveston, morning of the 16th, were justified by a severe NE. gale accompanied by very heavy rains during early morning of the 17th; maximum velocity at Indianola, 2:30 a. m., NE., 46; Galveston, 5:40 a. m., NE., 40, and at Port Eads, morning of the 17th, justified at 11 p. m., by a north-east wind of 35 miles, (estimated.) 18th, centre moved northeastward, preceded by southeast to north winds, and rain from Florida to Louisiana; the "Carrie Nelson" reported a heavy blow in $25^{\circ} 12' N.$ and $88^{\circ} 05' W.$ 19th, moved eastward over northern Florida, and thence northeastward, producing heavy rains along the South Atlantic coast and severe NE. gales along the coast of North Carolina. 20th and 21st, passed northeastward, south of Nova Scotia and Cape Breton, followed by northerly winds and rain along the coast; on these days heavy rains and southwest to northwest winds prevailed at the Bermudas. Cautionary Signals were ordered up at midnight of the 18th, and morning of the 19th, from Jacksonville to Kittyhawk; midnight of the 19th from Cape Henry to Sandy Hook, and morning of the 20th from New York to Eastport, and were justified, except at Jacksonville and along the New England coast. Maximum velocities on the 19th, at Tybee Island, 5:20 p. m., NW., 37; Cape Lookout, 9:30 p. m., NE., 52; Hatteras, 10:30 p. m., NE., 44; Kittyhawk, 11:30 p. m., NE., 49. On the 20th, Barnegat, 8:15 a. m., NE., 26, and Sandy Hook, 5:00 a. m., E., 30. On the 20th, SE. gales were experienced in $31^{\circ} 52' N.$, $77^{\circ} 12' W.$; $41^{\circ} 51' W.$, $63^{\circ} 35' W.$, and $43^{\circ} 06' N.$, $58^{\circ} 43' W.$

No. IX—was probably central in Manitoba on the 17th. 18th, was north of Lake Superior. 19th and 20th, north of Lake Huron, with light rains extending to Lake Erie. Its track is not charted.

No. X—appeared in the Missouri valley on the 19th, and moved rapidly southeastward during the 20th, almost without precipitation. During latter part of 20th, and early morning of the 21st, its centre remained almost stationary over Illinois and Indiana, with increasing cloudiness and a general light rain from the Upper Lakes to the Lower Mississippi valley; during latter part of day its centre was transferred to Virginia and North Carolina, with diminishing pressure and heavier precipitation from Georgia to New York. Heavy rain, turning into snow, fell in the Monongahela valley, causing a sudden rise in the rivers of this region. 22d, the 7:35 a. m. reports showed the lowest pressure, (about 29.20, or 0.90 below normal,) to be central over Chesapeake Bay, preceded by easterly gales and heavy rains along the New Jersey coast. At noon the centre was over Delaware Bay—Cape May barometer, 28.95, or about 1.10 inch below normal—and at 4:35 p. m., was central between Baltimore and Philadelphia, the barometers at these stations reading 28.98, or 1.08 and 1.05 inch, respectively, below normal. During the day the winds decreased over the Middle States as the centre of pressure enlarged in area, but increasing easterly gales, with high tides, prevailed along the New England coast and valley of the St. Lawrence; during the night the gale was specially severe in latter section and much damage was done to shipping. On the summit of Mount Washington the wind continued from the east all day, with light snow, the highest registered velocity of the month, 129 miles per hour, occurring at 4:30 p. m. Heavy snows fell in the Alleghany Mountains, the observer at Helvetia, Randolph Co., W. Va., reporting from 21 to 36 inches at altitudes of 1,300 and 1,800 feet. High westerly winds, increasing to gales at places on the North Carolina coast. 23d, the lowest pressure moved northward over New England, accompanied by light winds and calms, and followed by brisk westerly winds and clearing weather. Cautionary signals were ordered up along the Atlantic coast from Smithville to New York, on the 21st, (changed to Cautionary Off-shore on the 22nd,) and from New Haven to Eastport on the morning of the 22nd, (changed to Cautionary Off-shore morning of the 23rd, and were all justified. Maximum velocities on the 21st:—at Smithville, 10:00 a. m., W., 26; Wilmington, 2:30 p. m., W., 35; on the 22nd, Cape Lookout, 1:30 p. m., W., 52; Kittyhawk, 6:50 p. m., W., 40; Philadelphia, 9:30 a. m., NE., 38; Barnegat, 1:00 a. m., E., 38; Sandy Hook, 6:50 a. m., E., 56; New London, 12:40 p. m., E., 48; Wood's Holl, 1:55 p. m., E., 40; Boston, 3:30 p. m., E., 48; Thatcher's Island, 3:15 p. m., ESE., 50; Portland, 1:45 p. m., NE., 36; and, on the 23rd, Eastport, 12:20 a. m., NE., 60, with very high tides; Baltimore, 9:18 a. m., NW., 30; Cape May, 7:45 a. m., W., 52. Cautionary signals were also ordered up in the Lake region, but were only justified

on the Lower Lakes. Maximum velocities on the 22nd:—Oswego and Rochester, 5:15 p. m., NE., 32 and 30; Cleveland, 5:15 p. m., NW., 42; Sandusky, 6:45 p. m., NW., 42; and, on the 23rd, at Erie, 10:15 a. m., NW., 34, lake very rough.

No. XI—was probably northeast of British Columbia at midnight of the 21st, extending southwestward over Oregon, where the pressure was 0.30 below normal, followed, on the morning of the 22nd, by rising pressure, westerly winds and light rains. 22nd, moved southeastward to the Missouri valley, preceded by southeast winds in the Northwest. 23rd, moved down the Missouri valley, unattended by precipitation, except light snow in rear of the centre as the winds changed to colder northerly; during the day the lowest pressures of the month occurred over the Southwest and thence to Colorado and New Mexico, in which region a secondary centre of depression formed, which will be considered as area No. XII. 24th, the present area moved eastward over the central Mississippi and Ohio valleys, followed by northerly winds and light rains. 25th, moved from the Lower Lake region over New England, with light, but increasing, precipitation. 26th, passed south of Nova Scotia, and heavy rain prevailed for a short time at Halifax and Sydney.

No. XII.—Formed during the 23rd over the high lands in northwestern Texas and New Mexico, where high temperature prevailed during the afternoon. 24th, moved southeastward over Texas, followed by cold northerly winds, with snow in New Mexico and rain in western Texas. 25th, was off the coast of Texas and Louisiana, followed by brisk to high northerly winds, rain or snow in former, and preceded by easterly winds and heavy rain at New Orleans. 26th, moved northward, with southerly winds and heavy rains on the East Gulf coast, and generally rainy weather thence to Tennessee and Virginia. 27th, moved northward to the Lower Lakes, with heavy rains, thence to the Atlantic coast, and heavy snows from Arkansas to Michigan. 28th, passed down the St. Lawrence valley, with heavy rains, thence to the coast of New England and Nova Scotia. Cautionary Signals ordered up at Indianola and Galveston were justified on the 25th: Indianola, 10 a. m., N. 43, and Galveston, 7:45 p. m., NW. 32; on the Atlantic coast from Smithville to Sandy Hook on the 26th, (changed to Cautionary Off-shore on the 27th;) from New York to Eastport on the 27th, (changed to Cautionary Off-shore on the 28th;) and in the Lake region on the afternoon of the 27th were justified except at the stations in northern Michigan. Maximum velocities: on the 27th, at Wilmington, 1:45 p. m., SW. 31; Cape Hatteras, 4:00 p. m., S. 40; Kittyhawk, 4:35 p. m., S. and SW. 44; Barnegat, 8:40 p. m., SE. 40; Sandy Hook, 5:35 p. m., E. 47; New London, 10:20 p. m., SE. 45; Thatcher's Island, 11:00 p. m., SE. 34; Duluth, 11:00 p. m., NW. 34. On the 28th, Cape Lookout, 4:30 a. m., W. 40; Cape May, 3:45 p. m., W. 46; Newport, 10:40 p. m., NW. 32; Wood's Holl, 2:05 a. m., SE. 34; Thatcher's Island, 1:00 a. m., NW. 35; Eastport, 8:25 a. m., SE. 38; Erie, 6:30 a. m., W. 32; Cleveland, 4:10 a. m., NW. 36; Sandusky, 2:35 a. m., W. 37.

No. XIII—was probably north of Montana on the 25th, and passed eastward, over Manitoba, on the 26th, followed by high north winds and light snows in Dakota and Minnesota.

No. XIV.—During the 28th the pressure fell below the normal over the Western Plateau, and on the 29th in New Mexico, while high-pressure area No. IX was over Montana; light snows fell during these days from Idaho to Colorado and New Mexico; five inches of snow was reported at Summit, Rio Grande county, Colorado. During latter part of the 29th the lowest pressure was central over the high lands of western Texas. 30th, moved eastward to Arkansas, preceded by a heavy NE. snow-storm in the Lower Missouri valley, and followed by brisk to high northerly winds in Texas. Cautionary Off-shore Signals were ordered at Indianola and Galveston. Maximum velocity at Indianola, NW. 32. This area afterwards developed into quite a severe storm, and will be considered in the December REVIEW.

INTERNATIONAL METEOROLOGY.

On chart No. IV are shown the partial tracks of hurricanes occurring over the Oceans as follows: *Atlantic*.—No. I. as given in the September REVIEW; No. II, September 14th to 17th; No. III, September 24th to October 3rd, and No. IV, September 29th to October 8th, that were treated of in the October REVIEW as one storm, but Mr. Jahncke, of St. Thomas, considered them as two, whose paths crossed each other. No. V, October 9th to 20th, probably reached the British Isles. No. VI, October 14th to 19th, the track of which is nearly identical with that of No. V, but about five days later. No. VII, October 21st to 29rd, was treated of in the October REVIEW. *Pacific*.—No. I, September 12th; No. II, September 15th to 19th; No. III, September 19th; No. IV, October 7th to 9th; No. VI, October 17th to 19th. Additional reports of storms are to hand. *South Atlantic Ocean*.—September 8th, 31° 19' S., 31° 00' E.; September 25th to October 1, storm lasting six days off the coast of Brazil; October 3rd, heavy at Caracoe, Venezuela.

TEMPERATURE OF THE AIR.

The isothermal lines on chart No. II illustrate the general distribution of the temperature of the air for the month. The mean temperature for Punta Rasa should be 69°.6 instead of 74°, as given on the chart. By reference to the table on the left-side of the chart, it will be seen that the temperature has been considerably above the normal over the interior of the continent, the largest deviation from the normal (+13°.7) occurring in the Upper Missouri valley. Along the Pacific, Gulf and South Atlantic coasts it has ranged about, or slightly above, normal, and in the Middle States and New England about 3° above.

Minimum and Maximum Temperatures, respectively:—*Maine*—Mechanics' Falls, 15°, and 50°; Portland, 22°, 56°; Eastport, 17°, 54. *New Hampshire*—Dunbarton, 13°, 52°; Mt. Washington, —10°, 37°. *Vermont*